

REMARKS

Claims 1-22 are pending in this application. Of those claims, claims 8-10, 12-14 and 18-22 have been withdrawn from consideration pursuant to the provisions of 37 C.F.R. §1.142(b).

In this Amendment, claims 1, 2 and 15 have been amended, and claims 6 and 17 canceled. Care has been exercised to avoid the introduction of new matter. Specifically, claims 1 and 15 have been amended to include the limitations recited in dependent claims 6 and 17, respectively. Claim 2 has also been amended to correct a minor error.

Now, claims 1-5, 7, 11, 15 and 16 are active in this application, of which claims 1 and 15 are independent.

Claims 6, 7 and 17

There is no rejection of claims 6, 7 and 17 under 35 U.S.C. §§102 and 103. Applicants believe that these claims include patentable subject matter.

Objection to Claim 2

The Examiner suggested replacing the term “a semiconductor element” with --the semiconductor element--. Applicants have amended claim 2 in a manner suggested by the Examiner. Withdrawal of the objection is respectfully solicited.

Objection to Drawings

The Examiner alleged that the drawings do not show a plurality of crater-shaped recesses formed on a surface of the insulating base material that is contact with the insulator, as recited in claims 4, 5 and 16. The objection is respectfully traversed.

Each of Figs 11 and 12 shows a surface of an insulating base material viewed after plasma processing. Applicants invite the Examiner's attention to annular white images at the bottom left of Fig. 11 and approximately center of Fig. 12, respectively. Due to edge effect in SEM, luminance becomes higher in a projecting area. Thus, the annular white images indicate projections, respectively. Accordingly, areas surrounded by the annular white images are crater-shaped recesses.

Therefore, Figs. 11 and 12 respectively show a plurality of crater-shaped recesses formed on a surface of the insulating base material that is contact with the insulator, as claimed. Withdrawal of the objection to the drawings is respectfully solicited.

Claims 1-3, 11 and 15 have been rejected under 35 U.S.C. §102(b) as being anticipated by Kaneshiro et al.; and claims 6, 7 and 17 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Kaneshiro et al. in view of Bergmann et al.

As mentioned above, Applicants have amended independent claims 1 and 15 to include the limitations recited in dependent claims 6 and 17, and canceled claims 6 and 17, rendering the rejection of claims 1-3, 11 and 15 under 35 U.S.C. §102(b) moot. Accordingly, the Applicants will discuss that claims 1-5, 7, 11, 15 and 16 are patentable over the applied combination of Kaneshiro and Bergmann et al.

In paragraph 4 of the Office Action, the Examiner asserted that Kaneshiro et al. do not teach an average diameter of 1 nm to 20 nm of the projections. However, the Examiner asserted that Bergmann et al. teach the missing feature of Kaneshiro et al., and concluded that it would have been obvious to modify Kaneshiro et al. based on the teachings of Bergmann et al. to arrive at the claimed invention.

In response, Applicants submit that the applied combination of Kaneshiro et al. and Bergmann et al. does not teach a semiconductor module including all the limitations recited in independent claim 1, as amended. Specifically, the applied combination does not teach, at a minimum, “said minute projections include a plurality of projections of 1 nm to 20 nm in average diameter,” recited in independent claim 1 (originally recited in claim 6).

As admitted by the Examiner, Kaneshiro et al. do not teach a plurality of projections of 1 nm to 20 nm in average diameter. Applicants further emphasize that Bergmann et al. do not teach a plurality of projections of 1 nm to 20 nm in average diameter.

Bergmann et al. describe that “[r]eference numeral 5 denotes an adhesive of the layer of adhesive 2, and reference numeral 6 denotes agglomerates which include nanoparticles 7” and “[t]he agglomerates 6 are surrounded by an adhesive base composition in the adhesive 5 of the layer of adhesive 2.” (paragraph [0055]). Bergmann et al. further disclose that “the terminally conductive and electrically insulating nanoparticles have a mean diameter of between 10 and 200 nanometers” (paragraph [0037]). What Bergmann et al. describe is not the diameter of projections on the surface of the insulating base material, but the diameter of the nanoparticles 7. Accordingly, Bergmann et al. do not teach that there are projections of 1 nm to 20 nm in average diameter on the surface of adhesive 2. Applicants specifically note that the present invention is not to provide the insulating material as a molding resin with higher viscosity by having an average diameter of 1 nm to 20 nm for the projections. Rather, the present invention is to upgrade adhesion between the insulator and the insulating base material. Bergmann et al. do not teach the present invention.

Accordingly, the applied combination of Kaneshiro et al. and Bergmann et al. does not teach a semiconductor module including all the limitations recited in independent claim 1. The

above discussion is applicable to independent claim 15 reciting that “said minute projections include a plurality of projections of 1 nm to 20 nm in average diameter.”

In addition, there is no motivation to modify Kaneshiro et al. based on the teachings of Bergmann et al. to arrive at the claimed invention. The Examiner asserted that there is motivation because Bergmann et al. teach providing “the adhesive layer with higher viscosity (paragraph [0037])” (the first full paragraph on page 5 of the Office Action).

Kaneshiro et al. describe that the surface of solder resist film 5A is roughened to enhance adhesion between solder resist film 5A and the resin of sealed resin body 12 (see paragraph [0028]). On the other hand, Bergmann et al. describe control of viscosity of adhesive 2 by varying the diameter of nanoparticles 7 in adhesive 2. Applicants submit that controlling viscosity of adhesive 2 by varying the diameter of nanoparticles 7 does not impel a person skilled in the art to modify a roughening process of the surface of the solder resist to arrive at the claimed invention. Bergmann et al. do not teach any modification of the roughness on the surface of the solder resist. Rather, even if it is assumed that a person skilled in the art is motivated to modify Kaneshiro et al. based on Bergmann et al. as asserted by the Examiner, a modified device may include surface roughened solder resist film 5A of Kaneshiro et al. containing nanoparticles with a particular diameter taught in Bergmann et al. Accordingly, there is no motivation to modify Kaneshiro et al. to arrive at the claimed invention recited in independent claims 1 and 15.

Based upon the foregoing, Applicants submit that the Examiner has not established a *prima facie* basis to deny patentability to the claimed invention for lack of the requisite factual basis and want of the requisite realistic motivation. Dependent claims 2, 3, 7 and 11 are also patentably distinguishable over Kaneshiro et al. and Bergmann et al. at least because these claims

include all the limitations recited in independent claim 1. Applicants, therefore, respectfully solicit withdrawal of the rejection of claims under 35 U.S.C. §§102(b) and 103(a), and favorable consideration thereof.

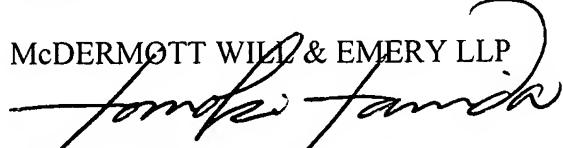
Conclusion

It should, therefore, be apparent that the imposed rejections have been overcome and that all pending claims are in condition for immediate allowance. Favorable consideration is, therefore, respectfully solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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